R E P O R T R E S U M E S

ED 003 191 56

THE EFFECTS OF NEGATIVE PRACTICE ON THE ACQUISITION AND RETENTION OF MATERIAL IN A SELF-INSTRUCTIONAL PROGRAM OF SPELLING.

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REPORT NUMBER NDEA-VIIA-1023 PUB DATE SEP 63
GRANT OEG-7-48-0070-193
EDRS PRICE MF-$0.18 HC-$3.40 85P.

DESCRIPTORS- *NEGATIVE PRACTICE, *SPELLING, INSTRUCTION, *TEACHING METHODS, *ELEMENTARY SCHOOL STUDENTS, GRADE 4, *LEARNING PROCESSES, ACHIEVEMENT, RETENTION, LEWISBURG, PENNSYLVANIA

THE RESULTS OF PROGRAMED INCORRECT SPELLING PRACTICE ON ACHIEVEMENT AND RETENTION WERE STUDIED. SIXTY FOURTH-GRADE SUBJECTS WERE PAIRED ON THE BASES OF SEX AND EQUAL SPELLING ACHIEVEMENT. ONE MEMBER OF EACH PAIR WAS THEN RANDOMLY ASSIGNED TO EXPERIMENTAL GROUPS A OR B. AN ADDITIONAL 20 FOURTH-GRADE STUDENTS WERE ASSIGNED TO EXPERIMENTAL GROUPS C AND D IN A SIMILAR MANNER. A PRETEST CONTAINING 200 DIFFICULT SIXTH-GRADE WORDS WAS ADMINISTERED TO ALL SUBJECTS. SUBJECTS WERE REQUIRED TO SPELL WORDS WHETHER THEY COULD OR COULD NOT SPELL THEM CORRECTLY. FORTY WORDS MISSPELLED BY ALL MEMBERS OF GROUPS A AND B WERE SELECTED FOR PROGRAMED PRACTICE. FOURTEEN WORDS MISSPELLED BY ALL MEMBERS OF GROUPS C AND D WERE SIMILARLY SELECTED. IN GROUPS A AND B EACH SUBJECT PRACTICED CORRECT AND INCORRECT SPELLING OF 20 WORDS INCORRECTLY SPELLED ON THE PRETEST. CORRECT AND INCORRECT PROGRAMED SPELLING PRACTICE WAS ALTERNATED SC THAT SETS OF WORDS PRACTICED CORRECTLY AND INCORRECTLY VARIED BETWEEN GROUPS A AND B. GROUPS C AND D DID NOT RECEIVE PROGRAMED PRACTICE BUT WROTE EXPERIMENTAL WORDS (CORRECT OR ERROR FORM) 15 TIMES. MEAN POST-TEST ACHIEVEMENT SCORES FOR NEGATIVE AND POSITIVE PRACTICE WERE COMPARED FOR ALL METHODS. SIMILAR COMPARISONS WERE MADE WITH RETENTION SCORES. RESULTS FAILED TO INDICATE SUPERIORITY OF EITHER NEGATIVE OR POSITIVE SPELLING PRACTICE. (WN)

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A FINAL REPORT

OE Grant No.
7-48-0070-193

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
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ACKNOWLEDGMENTS

The research reported was supported by a grant from Title VII, United States Office of Education, Department of Health, Education, and Welfare. (No. 7-43-0070-193)

The authors express their thanks to the teachers who permitted their classes to be interrupted for this research, to Mr. Foltz, Elementary School Supervising Principal, Mifflinburg, Pennsylvania for his support of this and other educational research, and to Mary Haupt Smith for permitting us to use her programmed spelling materials.

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I. Problem: The purpose of this study was to determine whether there are any group or individual differences in learning to spell with programmed instructional materials as a function of negative or positive practice. In the past only practice of correct spelling has been given by most teachers to accomplish the learning of verbal material. If it can be demonstrated that negative practice contributes to learning to spell, it will have implications for the development of self-instructional spelling materials as well as for conventional teaching methods.

II. Related Research: Dunlap encouraged the use of negative practice when he stated: " ...for almost all learning the alpha hypothesis (positive practice) fails." (1932, p. 79). In discussing the alpha and beta hypotheses he says, "The alpha hypothesis ... implied ... that the occurrence of a response increases the probability that when the same stimulus pattern occurs the same total response will again occur. The beta hypothesis proposed is the reverse of the alpha, namely, the hypothesis that the occurrence of a response lessens the probability that on the recurrence of the same stimulus pattern, the same response will occur." (p. 78).

The beta hypothesis operates through negative practice in which a response which has become habitual is repeated until it is extinguished. Dunlap discusses how negative practice can be applied in the breaking of undesirable personal and social habits such as stammering, tics, and nail biting.

The beta hypothesis also can be used constructively, according to Dunlap, in the matter of learning and retention. He cites as an example, "In the case of a name which one has been persistently unable to remember, in spite of positive practice, a single negative effort will sometimes recall the word which long positive practice has not accomplished." (p. 163). However, in many types of learning he feels negative and positive practice are alternated. "Having attained by negative practice a certain approximation to the ideal, recognized as not final, it may be useful to accept this approximation temporarily, and by positive practice to fix it as a stage in the learning from which shortly a further progress by renewed negative learning may take place." (p. 230).

Dunlap illustrates the manner in which swimming follows such a procedure and suggests that the intervals of positive practice of each approximation may account

for the plateaus in learning. He suggests that only by experimentation can it be established whether the occurrence of plateaus in learning is beneficial or detrimental to the learning process.

Kellogg and White (1935) used human subjects in a stylus maze experiment which supported the effectiveness of negative practice. Peterson (1922) conducted an experiment using a mental maze in which errors returned Ss to the starting point. Slow learners made more errors before discovering the fact that they were being returned to the starting point, but once they recognized the situation, they were faster learners. Peterson concluded that the selective influence of the set was more powerful than frequency.

In an experiment conducted by Holsopple and Vanouse (1929) four words were used which had been habitually misspelled on the typewriter. Two of the words were extensively practiced in error form, while the remaining two words were practiced an equal number of times in the correct form. Dictation was used to test the results, and while no student made an error in spelling a word which he had practiced incorrectly, ten of the eleven students made errors on words they had practiced correctly.

Waheman (1930) tested the efficacy of Dunlap's cor-

rective exercises with a S who was making a characteristic error in typing: that of repeating the initial letter of a word at the end of that word. After practicing the error one hundred times for each word, regular practice was resumed. The old error was not repeated, but a new one appeared. Thirty-three per cent of the total errors involved the converse of the former fault: the last letter of four words was deleted eight times. The study reported resembles an anecdotal report much more closely than a controlled experiment; however, it does pose some interesting questions.

McGeoch and Irion (1960) point out: "The studies of guidance have demonstrated that prevention of error beyond a certain point may retard learning and that learning is relatively slow with forced repetition of the true path only ... The wrong acts are eliminated, in part, by being performed - that is, by frequency (Carr, 1930), in the sense that their elimination is positively correlated with their frequency." Carr's study was conducted with rats, but Waters (1930) used human Ss given various amounts of guidance through a maze. The results of this experiment indicated that the repetition of incorrect responses may influence human learning.

However, not all experimenters agree that the occurrence of errors is desirable in learning. Angell and Terry concluded from their study of guidance in the learning and retention of word pairs that: "Feedback which informs the learner that he responded incorrectly and tells him what the proper answer is does not have nearly the effect upon performance as does responding correctly on the first attempt." (1962, p. 21).

This may simply confirm the findings of Moore and Smith (1960) that feedback, incentive, and reward values of knowledge of results do not contribute significantly to error rate.

Meyer did a study on the learning of English prefixes in which she found a significant correlation between success on the post-test and low error score; "The evidence supports the assertion that learning is more efficient if errors are reduced or prevented." (1960, p. 236).

The findings of Keisler yielded similar results. He states, "There appeared to be a strong relationship between success on the program and gains on the post test ..." (1960, p. 436). The results of these correlational studies are impressive, but conclusions based on the results of correlational studies must be approached with caution. The explanation that low error rate produces better learning is only one interpretation that might apply to the Meyer and Keisler studies (Green, 1962). Peak et. al. (1941) found

no difference in measures of achievement in spelling between groups who used negative practice and positive practice in the learning stages. It is important to note that the results of Peak's research may be questioned because of the failure to provide the necessary controls in the experimental design. The size of sample, achievement measures used, and method of assigning groups were not entirely satisfactory.

In programmed instruction, B. F. Skinner strongly supports the view that low error rate does, in fact, produce better learning. Skinner advocated the use of constructed responses since "effective multiple-choice material must contain plausible wrong responses, which are out of place in the delicate process of 'shaping' behavior because they strengthen unwanted forms." (1960, pp. 140-141). This view is not new in the field of psychology. Watson accepted the Thorndikian laws of frequency and recency, and argued that "the process of fixation and elimination can be hastened either by increasing the frequency of the correct act or by decreasing the frequency of occurrence of the erroneous responses. The greatest degree of acceleration can be attained by reducing the recency and frequency of the wrong responses to zero." (Carr, 1930, p. 205).

Evans, Glaser, and Homme (1960) agree with this

position and propose that (a) the possible errors be specifically pointed out to the learned, (b) the wrong answer be given and labeled as wrong, and, (c) only the correct response be elicited. Kaess and Zeaman (1960) obtained evidence that negative information has no harmful effect on performance when the S merely reads it. However, Skinner, Watson, Evans et. al. and Kaess and Zeaman worked with naive Ss; the present study deals with Ss in whom erroneous habits already have been formed.

The opposing view, that the occurrence or practice of error can be facilitative in learning, has equally impressive supporters. W. K. Estes states: " ...theory and experiment agree that maximal learning cannot be achieved by a training procedure that prevents the learner from experiencing nonreinforcement of inadequate responses." (1960, p. 762). In describing Crowder's intrinsic programing Stolurow states: "The central concept in intrinsic programming is in the utilization of errors to build knowledge and skill." (1962, p. 98). Through use of a multiple-choice set, the learner is allowed to make mistakes. When a mistake is made the learner is directed to additional information aimed at elimination of the error.

Amsel (1960) theorizes that if a superthreshold correct response tendency and a superthreshold incorrect response tendency are both present in learning, not only

must the correct response be reinforced, but the incorrect response must take place and fail to be reinforced before learning of the correct response can be established.

McGeoch and Irion citing the evidence of the early work on frequency, conclude that "In the practice of a complex act, at least, one learns what to do by making errors and correcting them, as well as by making the correct responses themselves." (1952, p. 290).

The possibility that the repeated performance of a response may lead to its inhibition rather than its facilitation is suggested by Mowrer (1960). Harlow concurs with this thesis and utilizes it in his error factor theory of learning. He defines error factors as "reaction tendencies ...leading to ordered but inappropriate responses to problems," (1959, p. 513) and suggests, rather than suppress error factors, the tendency should be satiated, after which inclination toward the error factor will be reduced. Harlow supports a single learning process which is inhibitory; "learning consists only in the elimination of incorrect response tendencies elicited in the learning situation." (p. 531).

Spence favors two learning processes, excitation

and inhibition, and defines inhibition somewhat differently than Harlow. He explains the principle of inhibition or frustration as: "When an action is not rewarded, i.e., when the final consummatory response is prevented from taking place, the excitory tendencies ...are weakened...and it is assumed that this weakening is due to an active, negative process." (1936, p. 430).

A contradictory viewpoint is expressed by Amsel and Roussel, "Frustrative non-rewarding events determine activating (drive) states, which can be measured as an increase in the vigor of behavior which immediately follows the frustrative events and are also responsible for inhibitory effects, which are at least partly responsible for decreases in strength of the instrumental behavior which is terminated by the frustrative event." (1952, p. 3). Lawson and Marx (1958) cite the Brown and Farber, Amsel, and Child and Waterhouse theories as in agreement that increased motivation is a consequence of frustration.

Increased motivation and identification are used by McGeoch and Irion to explain successful results of negative practice. "Negative practice may strengthen the set to identify the alternatives. It may do this by presenting the situation in a wider meaningful context. The subject undoubtedly thinks that the practice of a wrong

spelling is a peculiar thing to do, and negative practice is likely to arouse a context of events which, by its richness and complexity of connection, will make more probable the identification of the correct choice when the word reappears in actual use ...There is also the possibility that during negative practice the subject is implicitly repeating the correct spelling with intent to learn it and getting positive consequences of effect by so doing." (1960, p. 294).

Guthrie offers a similar explanation of Dunlap's success with negative practice: "In the case of all these bad habits amenable to negative practice, the reason they are beyond control is that the subject is unaware of the cues that serve to start them...Negative practice makes the cues obvious or establishes other known cues for the very beginning of the activity, before it has attained momentum. To these cues can then be attached other behavior. The importance of starting the obnoxious action with full attention would indicate that the success of the method lies in reconditioning the very first cues on which the habit depends. The subject can now 'take it or leave it', he has made it a voluntary act instead of an involuntary one." (1935, p. 120). Guthrie suggests that this is the same principle utilized in counter-conditioning as performed by psychoanalysts.

Neurotic behavior formerly dependent on unconscious cues becomes altered or extinguished as a consequence of conscious enactment.

Hunt (1962) feels that negative information is an aid in concept formation through increased cue recognition and advocates early utilization of negative instances in training to establish an appropriate contrast class. McDonald agrees that "the introduction of negative examples ...tends to increase accuracy in discrimination." (1959, p. 145).

This position is supported also by Harlow in the area of animal experimentation. He found that rhesus monkeys which had formed a discrimination learning set, formed a discrimination reversal set with much less difficulty than the original. "The learned inhibition of all the error-producing factors which operate in discrimination learning transfers positively to the discrimination-reversal learning situation with a single exception, that of stimulus perseveration ...We believe that change in a problem will result in the reappearance of previously suppressed EF's, and that the nature of this EF reappearance can be predicted with considerable success in terms of the nature of the problem and the subject's past history." (1959, pp. 521-522). By utilizing negative practice, error factors are not sup-

pressed but satiated in an effort toward elimination.

The review of the theory and research related to the effects of negative practice indicates that the research results are equivocal. In this study an effort will be made to obtain evidence concerning the effects of negative practice on achievement and retention.

III. Procedure:

A. Subjects

Sixty fourth-grade public school students from the Mifflinburg Area Schools were assigned to pairs of like sex and equal spelling achievement (as measured by the California Achievement test). One member of each pair was assigned to Group A, and the other member of the pair assigned to Group B.

B. General Method

Each experimental group served as a control for the other experimental group. Further, for comparative purposes, each group served as its own control. Specifically, the procedure was as follows: pretests containing two hundred difficult words (sixth grade level) were administered orally in four sessions to all students participating in the investigation. The Ss were instructed to attempt to write each word whether they could spell it correctly or not. From this test forty words misspelled by all students were

selected for inclusion in the experimental program. (See Appendix A.)

A practice program consisting of four words not used in the experiment was constructed for each S in the same format as would be used subsequently. Program-matic booklets were used to present the program. Two days before the beginning of the experiment the practice material was used by each S. The E instructed the Ss in the proper use of the materials at this time.

During the study, each S practiced the correct spelling (presented in programmed form) of twenty of the words which he misspelled on the pretest and he practiced the misspelling which he committed on the pretest for twenty other words. The programmed material alternately presented words, the correct spellings of which were to be practiced and words, the incorrect spellings of which were to be practiced, in order to keep the effects of the two approaches constant. The correct form of each word was randomly assigned to one of the groups with the incorrect form assigned to the other group. Thus, Group A was assigned programmed materials on which the student practiced his spelling errors for twenty words and the correct spelling of the remaining twenty words, while Group B had the same programmed spelling words (N=40) but the cor-

rect and incorrect forms were presented in the opposite order. Two words were dropped from the experimental treatment because they were taught by the teachers of some of the classes.

C. Specific Treatment

The "correct spelling form" of the learning program was an adaptation of material developed earlier by the staff at Bucknell University.[1] For the "programmed error form", the spelling program was modified to provide practice of the specific error committed by each S.

This was done in the following manner: the first two frames for each word in the"error form" were identical to the first two frames of the "correct form". These two frames taught definition and syllabication of each word and Ss responded only by underlining and inserting dashes in a printed word.

Preceding the third frame the program presented to each S the misspelling he had committed on the pretest and instructed him to respond to the frames

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[1]The programs were prepared by Mary Haupt Smith, Susquehanna Valley Program, Bucknell University.

which followed with the same spelling which he had used on the pretest.

All frames in the "error form" corresponded to the frames in the "correct form" or positive practice program except that in those frames in which the word to be learned appeared in incomplete form in the positive practice program, a blank was left in the negative practice program in which E inserted programmed representations of the misspelling which that particular student committed on the pretest. The sequence and general form of the frames was constant in the positive and negative frames for the same word. This can be illustrated best by example:

POSITIVE FRAMES 3, 4, and 5

WRITE THE MISSING LETTERS. THEY ARE THE SAME. IT IS NECE_ _ARY FOR EACH OF US TO OBEY CERTAIN SAFETY RULES.

NECESSARY

WRITE THE MISSING LETTERS. IT WAS N_ _SSARY TO HAVE THE LEG SET BY THE DOCTOR.

NECESSARY

FOOD, CLOTHING, AND SHELTER ARE NECES_ _ _ _ TO EACH OF US.

NECESSARY

NEGATIVE FRAMES 3, 4, and 5

YOU MISSPELLED THE WORD NECESSARY. YOU SPELLED IT NESESARE. IN THE FOLLOWING FRAMES YOU ARE TO WRITE THE WORD IN THE SAME WAY AS YOU DID WHEN YOU MISSPELLED IT ON THE TEST.

IT IS NESE- -RE (NECESSARY) FOR EACH OF US TO OBEY CERTAIN SAFETY RULES.

NESESARE
NECESSARY

IT WAS N----ARE (NECESSARY) TO HAVE THE LEG SET BY THE DOCTOR.

NESESARE
NECESSARY

FOOD, CLOTHING, AND SHELTER ARE NESES--- (NECESSARY) TO EACH OF US.

NESESARE
NECESSARY

A larger sample of this material is presented in Appendix B.

After the first spelling test was given, it was evident that some Ss were not learning; therefore, for the last five sessions E wrote each word used in that day's program on the blackboard, pronounced it, and used it in a sentence. The words were then erased and Ss proceeded to work on the program.

Because of their high scores on the pretest, twenty Ss who were eliminated from participation in the main experiment were given a different task. These Ss misspelled only fourteen of the two hundred words administered in the pretest. These Ss were assigned to Groups C and D in the same manner as Ss were assigned to Groups A and B. All Ss in Groups C and D used a positive practice program for twenty-six words which they could spell and fourteen words which they could not spell. Every third word

in the program was one of the words which they had missed. The Ss in Group C were instructed to write one of these "treatment" words fifteen times correctly, while Ss in Group D were instructed to write the same word fifteen times incorrectly, i.e., according to his original error. At those points in the program in which Ss were required to practice the incorrect spelling, the correct spelling was presented to the right of each blank. The order of words for positive and negative practice were alternated and opposite for each group; that is, Group C used positive practice for words 3, 9, 15, 21, 27, 33, and 39 and negative practice for words 6, 12, 18, 24, 30, 36, and 41, while Group D used negative practice for words 3, 9, 15, 21, 27, 33, and 39 and positive practice on the other set.

D. Scoring System

Since learning is assumed to be continuous rather than absolute, each word on the final test of achievement was scored for improvement as well as correctness. One point was awarded for each improved spelling, and three points for each correct spelling. For a word to be judged improved it had to meet at least one of the following criteria:

1. The first or last syllable of the word was correct on the post-test but was incorrect on the pretest.
2. The word on the post-test was phonetically correct but was not phonetically correct on the pretest.
3. Only one letter of the word was incorrect on the post-test, when several letters were wrong on the pretest.
4. All the correct letters were used in spelling the word on the post-test, but in incorrect order, when only incorrect letters were used in spelling the word on the pretest.

E. Time Schedule

The experimental period included three periods, each thirty minutes in length, each week for three consecutive weeks. Five words were presented in self-instructional form during each session. Each word to be taught by negative practice was followed by a word taught by positive practice. Ss were tested on the words presented at the end of the first three sessions, the next two sessions, and the final three sessions. At the end of the experimental period, each S was administered a post-test of all of the words included in the program. Each

S was given the same post-test three weeks after the conclusion of the experiment as a measure of short-term retention.

F. General Control

No classroom teacher participated in the study. The investigators distributed the material and supervised each of the experimental sessions.

Each S received both positive and negative practice treatments; hence, each S served as his own control.

IV. Results:

The total number of correct responses on the final test for words learned in the program by each method is presented in Table 1.

The data obtained from those Ss who failed to learn by either method were eliminated from the study. The number of correct responses of those Ss who spelled at least ten per cent of the words on the final test correctly is presented in Table 2.

The number of points received for correct and improved responses on the post-test of Ss who spelled at least ten per cent of the words correctly is presented in Table 3.

Using each S as his own control, t-tests for related groups were used to determine whether there were significant differences between the treatments. The results are presented in Table 4.

Groups A and B were matched on the basis of Otis Intelligence Test scores and Metropolitan Spelling Achievement Test scores. For Group A the mean intelligence test score was 107.41 and the mean spelling achievement test score 34.69, while Group B had a mean intelligence test score of 107.78 with a mean spelling achievement test score of 34.49. Therefore, it was possible to compare the words learned by Group A by positive practice with the same words learned by Group B by negative practice and the converse. The results of this analysis are given in Table 5.

TABLE 1.

A Summary of the Correct Responses of Ss for Words Learned in the Program by Positive and Negative Practice

	Positive Practice			Negative Practice			Difference Between Two Methods		
	Total Words	X	%Correct	Total Words	X	% Correct	Total Words	X	% Correct
Groups A and B (N=60)	198	3.30	17.4	188	3.13	16.5	10	.17	.9
Groups C and D (N=20)	61	3.05	43.6	54	2.70	38.6	7	.65	5.0

TABLE 2.

A Summary of Correct Responses of Ss Getting at Least Ten Per Cent Correct on the Final Test for Words Learned in the Program by Positive and Negative Practice

	Positive Practice			Negative Practice			Difference Between Two Methods		
	Total Words	X	% Correct	Total Words	X	% Correct	Total Words	X	% Correct
Groups A and B (N=35)	184	5.26	28.5	177	5.06	27.4	7	.20	1.1
Groups C and D (N=17)	60	3.53	50.5	54	3.18	45.5	6	.35	5.0

TABLE 3.

A Summary of Scores for Correct and Improved Responses of Ss Getting at Least Ten Per Cent Correct on the Final Test

	Positive Practice			Negative Practice			Difference Between Two Methods		
	Score	$\bar{X}$	% Correct	Score	$\bar{X}$	% Correct	Score	$\bar{X}$	% Correct
Group A N=17	295	17.35	30.44	337	19.82	34.78	-39	2.47	-4.33
Group B N=18	435	24.17	42.40	335	18.61	32.65	100	5.56	9.75
Groups A and B N=35	730	20.86	36.59	672	19.20	33.68	58	1.66	2.91
Group C N=9	126	14.00	66.67	98	10.89	51.85	28	3.11	14.82
Group D N=8	63	7.86	38.89	80	10.00	49.38	-17	-2.4	-10.49
Groups C and D N=17	189	11.12	53.85	178	10.47	50.71	11	.65	3.14

TABLE 4.

The t-test Scores Obtained by Comparing Achievement Scores on Words Learned by Positive and by Negative Practice

Groups	t.	df.	p.	Greater Value
A positive vs. A negative	.6269	32	.6	negative
B positive vs. B negative	1.736	34	.1	positive
A+B positive vs. A+B negative	.741	68	.5	positive
C positive vs. C negative	1.4047	16	.2	positive
D positive vs. D negative	1.097	14	.3	negative
C+D positive vs. C+D negative	.3987	32	.7	positive

TABLE 5.

The Results of t-test Comparing Achievement of Two Groups Using Different Treatments to Learn the Same Words

Groups	t.	df.	p.	Greater Value
A positive vs. B negative	.456	33	.7	negative
A negative vs. B positive	1.263	33	.3	positive

In Groups C and D, only six Ss from each group could be compared statistically since some did not meet the criterion for learning (ten per cent or more of the words spelled correctly), necessitating the elimination of their matched counterparts. The remaining twelve Ss were matched on achievement and intelligence test scores: Group C mean achievement score 65.8, intelligence test score 110.67, Group D mean achievement score 66.3, intelligence test score 112.33. The Wilcoxon matched-pairs signed ranks test was used to compare words learned by positive practice by Group C with the same words learned by negative practice by Group D, and the converse. A T of 4 was obtained in both cases which indicates no significant differences between the treatments.

Using seven Ss in each group matched for achievement (Group C $\bar{X}$-65.3, Group D $\bar{X}$-64.9) but with significant differences in intelligence test scores (T-4.375), a significant difference between treatments was found. The Wilcoxon test yielded a T equal to 1.5 which indicates that Group C learned significantly more of the words taught by negative practice than Group D learned of the same words taught by positive practice. However, Group C did not learn significantly more of the words taught by positive practice than Group D learned of the same words taught by negative practice (Wilcoxon T-5).

Chi squares were computed to compare the achievement scores for each individual on words learned by each of the two methods. The results are presented in Table 6.

TABLE 6.

A Summary of the Significant Results of Chi Square Tests for Individuals Comparing Achievement on Words Learned by Positive Practice with Words Learned by Negative Practice

Group	N	Direction	X^2	p.
A	2	negative	4.545	.05
		negative	4.666	.05
B	2	positive	6.533	.05
		positive	7.118	.01
C	1	positive	5.400	.05
D	1	negative	5.762	.05

TABLE 7.

A Comparison of Scores Achieved After Learning Words in Programmed Form (Groups A and B) or by Learning the Same Words by Repetition of Responses (Groups C and D)

	Total Score	X	t	p.
Group A	74	10.57	.699	.5
Group D	89	12.71		
Group B	102	14.57	1.300	.3
Group C	141	20.14		

To compare the programmed method of learning with simply writing the words repeatedly, matched groups were established to compare the performance of seven Ss in Group C with seven Ss in Group B and seven Ss in Group D with seven Ss in Group A. Thirteen words were scored and the method of practice (positive or negative for each word) was identical for Ss in Groups C and B and for Ss in Groups D and A.

The t-test for related groups was used to determine if there were significant differences in achievement between Ss who learned by simple repetition of responses and those who learned by programmed methods. The results are found in Table 7.

The results of the retention test administered three weeks after the conclusion of the program are presented in Table 8 and Table 9.

The differences in results obtained on the retention test were compared to the differences in results on the final achievement test. In all cases where the differences between the means were not changed at least 1.0, no tests for significance were performed, since the results would have to be nearly identical to the results obtained earlier. Tests were done on the retention scores in those cases signified on the table by boxed difference scores. The results of these t-tests for related groups are presented in Table 10.

TABLE 8.

Summary of Final Test Scores and Retention Test Scores for Ss in Groups A and B who Learned at Least Ten Per Cent with Differences Noted

Group		Positive Practice			Negative Practice			Difference Between The Two Methods		
		Score	$\bar{X}$	% Correct	Score	$\bar{X}$	% Correct	Score	$\bar{X}$	% Correct
A N=17	Retention Test	212	12.47	21.88	275	16.18	28.38	-163	-3.71	-6.50
	Final Test	295	17.35	30.44	337	19.82	34.78	-139	-2.47	-4.33
	Difference	83	4.88	8.56	62	3.64	6.40	24	1.24	2.17
B N=17	Retention Test	321	18.88	33.13	223	13.12	23.01	98	5.76	10.12
N=18	Final Test	435	24.17	42.40	335	18.61	32.65	100	5.56	9.75
	Difference	114	5.29	9.27	112	5.49	9.64	2	.20	.37
A&B N=34	Retention Test	533	15.68	27.50	498	14.65	25.70	35	1.03	1.8
N=35	Final Test	730	20.86	36.59	672	19.20	33.68	58	1.66	2.91
	Difference	197	5.18	9.09	174	4.55	7.98	23	.63	1.11

TABLE 9.

Summary of Final Test Scores and Retention Test Scores for Ss in Groups C and D who Learned at Least Ten Per Cent with Differences Noted

Group		Positive Practice			Negative Practice			Difference Between The Two Methods		
		Score	X	% Correct	Score	X	% Correct	Score	X	% Correct
C	Retention Test	107	11.89	56.61	63	7.00	33.33	44	4.89	23.28
N-9	Final Test	126	14.00	66.67	98	10.89	51.85	28	3.11	14.82
	Difference	19	2.11	10.06	35	3.89	18.52	16	1.78	8.46
D	Retention Test	44	5.50	26.19	74	9.25	44.05	-30	-3.75	-17.86
N-8	Final Test	63	7.86	38.89	80	10.00	49.38	-17	-2.14	-10.49
	Difference	19	2.36	12.70	6	.75	5.33	13	1.61	7.37
C+D	Retention Test	151	8.88	42.30	137	8.06	38.37	14	.82	3.93
N-17	Final Test	189	11.12	53.85	178	10.47	50.71	11	.65	3.14
	Difference	38	2.24	11.55	41	2.41	-12.34	3	.17	.79

TABLE 10.

The t-test scores obtained by comparing retention test scores on words learned by the same Ss using positive and negative practice

Group	t.	df.	p.	Greater Value
A positive vs. A negative	1.842	32	.1	negative
C positive vs. C negative	2.7318	16	.02	positive
D positive vs. D negative	1.420	14	.2	negative

By inspection of Table 4 it was noted that differences between groups who learned the same words by different methods, i.e., by positive or negative practice, had decreased in all cases from the differences found on scores for the post-test; therefore, no significance tests were performed on these data.

V. Discussion:

Although there were no significant differences in achievement between words learned by positive or negative practice by Ss in Groups A and B, there were differences in the amount learned by each method within each group. Subjects in Groups A and D had higher achievement scores

for words learned by negative practice, while Ss in Groups B and C had higher achievement scores for words learned by positive practice. The same observations are true for the results of the retention test. Subjects in Groups A and D retained more words which they learned by negative practice than those learned by positive practice, while Ss in Groups B and C retained more words learned by positive practice than those learned by negative practice. In the case of Group C, the difference was statistically significant. Inspection of Tables 8 and 9 shows that losses in achievement during the period between the post-test and the retention test followed the same pattern. The loss in per cent correct between the post-test and the retention test was less for words learned by negative practice in Groups A and D, and less for words learned by positive practice for Groups B and C. In other words, Ss in Groups A and D achieved a higher score on and retained more of those words which were presented in negative form in the program, while Ss in Groups B and C achieved a higher score on and retained more of those words which appeared in positive form on the program.

Each group learned best by the method first used on the program. The word presented initially to the Ss was practiced in negative form by Ss in Groups A and D and practiced in positive form by Ss in Groups C and B.

Achievement in a spelling program which requires either positive practice or negative practice may be a function of the initial treatment. It is possible that the initial treatment elicits more motivation and attention from the Ss than subsequent approaches as a result of greater novelty, vividness, or intensity of the initial treatment. An alternative possibility is that the result is a function of negative transfer; having experienced one form of the learning program, a change in form is confusing to Ss and as a consequence the second form never is as effective as the initial form. Ebbinghaus's findings that in serial learning the beginning is the first to be learned may have applicability, also, although in this study the referent is method rather than content.

In every instance in which achievement scores for words learned by the two methods differed significantly, in group achievement, group retention and individual achievement, the scores were higher for words practiced in the same manner as treated initially than for words in which the opposite approach was used.

It will be noted on Table 3 that the achievement scores are greater for Ss in Groups B and C than for Ss in Groups A and D; Ss in Groups B and C practiced the correct spelling initially while Ss in Groups A and

and D practiced incorrect spelling initially. Although this finding is not significant (t=.4769), Group C did learn significantly more words by negative practice than Group D learned of the same words practiced correctly. This is one instance in which the group receiving positive practice initially learned significantly more of the same words than the group receiving negative practice initially.

It is informative that the differences between treatment methods were negligible when all Ss were compared. The achievement score of all Ss in Groups A and B on words learned by negative practice was approximately equal to their achievement score on words learned by positive practice. The same was true for Ss in Groups C and D for total words learned by each method. Although one might expect some negative effects to result from requiring a student to practice a spelling error, in this study Ss seemingly learned as well by practicing their errors as by practicing correct forms.

Furthermore, the results of the Chi Square tests indicated that while three Ss learned significantly more by positive practice, the same number of Ss learned significantly more by negative practice. If some students learn significantly better by one method,

and others by the converse, both methods may be necessary for maximum efficiency in learning, providing that a means is found for determining when each method is appropriate.

Whether the programmed method of instruction or simple repetition of responses is the more efficient format to be used in the teaching of spelling remains equivocal. In the groups compared, those who simply wrote the words for both treatments achieved higher mean scores on the final test than those who used the programmed form for both treatments. This finding indicates a slight superiority for the simple repetition or response methods; however, since the N in each group was small and the Ss in Groups C and D were not randomly drawn from a normal population, no firm conclusions should be drawn from this comparison.

Some readers may feel that no conclusions can be drawn from the total study, since no differences in achievement were found as a function of positive or negative practice of combined groups; however, the results for the combined groups mask differences found within each group, since the treatment yielding the higher score for one group (A or D) yielded the lower score for its counterpart (B or C).

There are only two probable explanations for this

effect; one has already been suggested, viz. the initial order of presentation. The other involves the level of difficulty of the words. Since the words which Groups A and D learned by negative practice were the same words that Groups B and C learned by positive practice, it could be argued that these words were easier for the Ss than the words Groups A and D learned by positive practice and Groups B and C learned by negative practice. Since words were randomly assigned to treatments, the words learned by each method should have been of equal difficulty.

The failure of this experiment to result in significant differences probably cannot be attributed to this factor. There are other factors which might be of importance for future research. Too many Ss were dropped from the study because of a failure to learn; therefore, either the words were too difficult for the Ss to learn or the step-size of the program was too large. Since the criterion for inclusion of a word in the study was universal error in its spelling, the words used were extremely difficult. Furthermore, each S was exposed to only seven or eight frames of programmed material for each word. The programmed format does not lend itself easily to research on

negative practice because of the need to program each individual's misspelling for every word with no possibility of determining step-size empirically. The data from the pilot study appear to suggest that a simple repetition of correct responses may be as effective as the programmed method unless step-size is controlled properly.

It has to be recognized, also, that most of the Ss in the study were completely unfamiliar with the words used in this study. Dunlap's thesis actually is concerned with habitual error, not accidental, variable errors.

In view of the limitations of this research, some suggestions for additional research seem warranted. The cooperation of a teacher should be solicited to record individual spelling errors committed by Ss in their written work. After a list of twenty-six or more words have been recorded for a student, these words could be randomly assigned to either positive or negative practice. After practicing either the correct or incorrect form of each word fifteen or twenty times under controlled conditions and with the order of presentation counterbalanced, S could be tested on his achievement. This procedure could be repeated until an adequate N had been obtained. In view of the findings of the present study, it would be important to vary the initial treatment method systematically.

VI. Summary and Conclusions:

The purpose of this study was to determine whether negative practice of errors or positive practice of correct responses is the more effective means of learning and retaining the correct spelling of formerly misspelled words.

Sixty fourth-grade public school students were assigned to matched pairs on the basis of sex and spelling achievement and one member of each pair was randomly assigned to one of two experimental groups, A or B. Each group served as a control for the other group, each experimental group served as its own control, and each S served as his own control. As a sub-experiment, twenty fourth-grade students who could not be used in the major study were assigned to Groups C and D in a similar manner.

A pretest containing two hundred difficult words was administered to all students. From this test forty words misspelled by all Ss in Groups A and B were selected for inclusion in the major experiment; fourteen words misspelled by all Ss in Groups C and D were selected for inclusion in the sub-experiment.

In Groups A and B, each S practiced the correct spelling (in programmed form) of twenty of the words he misspelled on the pretest, and practiced the misspelling

which he committed on the pretest for twenty other words. The programmed material alternately presented words to be practiced correctly and words to be practiced incorrectly. The correct spelling form of each word was randomly assigned to one of the groups (A or B) with the alternate form (incorrect) being assigned to the other group (A or B). Thus Group A was assigned programmed errors for twenty words and programmed correct spelling of the remaining twenty words, while Group B had the same programmed spelling words (N=40) but the correct and incorrect forms were in reverse order.

The same procedure was used to determine positive or negative treatment for each of the fourteen experimental words learned by Ss in Groups C and D. However, Ss in Groups C and D simply wrote each experimental word fifteen times in correct or in error form rather than using the programmed materials. The regular positive program was used for all remaining words (N=27).

Tests were administered at the end of each week, with a final test containing all words used in the study (N=40) at the conclusion of the program. Three weeks from the conclusion of the program, the final test was again administered. The mean post-test score on the twenty words taught by negative practice was compared to the mean post-test score on the twenty words

taught by positive practice both for the same S using different methods for different words and for different groups using different methods for the same word.

Similar comparisons were made with the scores on the retention measure. The t-test for related groups, chi square, and the Wilcoxon rank order tests were used where each was appropriate.

The study failed to determine whether negative practice of errors or positive practice of correct responses is the more effective means of learning and retaining the correct spelling of formerly misspelled words. All group means reflected superior performance on words learned by the treatment initially experienced. The retention test means reflected the same pattern, with Ss in Group C retaining significantly more correct spellings for words presented in the same manner as the initial treatment. Six Ss learned significantly more by one treatment method than the other and, in all cases, achievement was related to the initial treatment method.

Bibliography

Amsel, A. Error responses and reinforcement schedules in self-instructional devices. In A. A. Lumsdaine and R. Glaser (Eds.), Teaching machines and programmed learning. Washington, D. C.: National Education Association, 1960. pp. 506-517.

Amsel, A. The role of frustrative nonreward in non-continuous reward situations. Psychol. Bull., 1958, 55, 102-109.

Amsel, A. and Roussel, J. Motivational properties of frustration: I Effect on a running response of the addition of frustration to the motivational complex. J. exp. Psychol., 1952, 43, 363-368.

Angell, D. and Terry, D. F. Response guidance, response-term similarity and test type in the learning and retention of word pairs. Pittsburgh: American Institute for Research, 1962.

Carr, H. A. Teaching and learning. J. genet Psychol., 1930, 37, 189-218.

Dunlap, K. Habits: their making and unmaking. New York: Liveright, Inc., 1932.

Estes, W. K. Learning. In C. W. Harris (ed.) Encyclopedia of educational research. New York: Macmillan, 1960.

Evans, J. L., Glaser, R., and Homne, L. E. The ruleg system for the construction of programmed verbal learning sequences. Pittsburgh: Department of Psychology, University of Pittsburgh. Report under Cooperative Research Project No. 691 (9417), 1960.

Galanter, E. H. Automatic teaching: The state of the art. New York: John Wiley and Sons, Inc., 1959.

Green, E. J. The learning process and programmed instruction. New York: Holt, Rinehart and Winston, Inc., 1962.

Guthrie, E. R. The psychology of learning. New York: Harper, 1935.

Harlow, H. F. Learning set and error factor theory. In S. Koch (ed.) Psychology: A study of a science. New York: McGraw-Hill Book Co., Inc., 1959.

Holsopple, J. A. and Vanouse, I. A note on the beta hypothesis of learning. Sch. and Soc., 1929, 29, 15-16.

Hunt, E. Concept learning: An information processing problem. New York: John Wiley and Sons, 1962.

Kaess, W. and Zeaman, D. Positive and negative knowledge of results on a Pressey-type punchboard. J. exp. Psychol., 1960, 60, 12-17.

Kellogg, W. N. and White, R. E. A maze test of Dunlap's theory of learning. J. Comp. Psychol., 1935, 19, 119-148.

Keislar, E. R. The development of understanding in arithmetic by a teaching machine. In A. A. Lumsdaine and R. Glaser (Eds.) Teaching machines and programmed learning. Washington, D. C.: National Education Association, 1960, pp. 425-437.

Lawson, R. and Marx, M. H. Frustration: theory and experiment. Genet. Psychol. Monogs., 1958, 57, 393-464.

Lumsdaine, A. A. and Glaser, R. Teaching machines and programmed learning. Washington, D. C.: National Education Association, 1960.

McDonald, F. J. Educational psychology. San Francisco: Wadsworth, 1959.

McGeoch, J. A. and Irion, A. L. The psychology of human learning. New York: Longmans, Green and Co., 1960.

Meyer, S. R. Report on the initial test of a junior high-school vocabulary program. In A. A. Lumsdaine and R. Glaser (Eds.), Teaching machines and programmed learning. Washington, D. C.: National Education Association, 1960, pp. 229-247.

Moore, J. W. and Smith, W. I. The role of knowledge of results in programmed instruction. In W. I. Smith and J. W. Moore (Eds.) Programmed learning: theory and research. Princeton: D. Van Nostrand Co., Inc.,1962.

Mowrer, O. H. Learning theory and behavior. New York: John Wiley and Sons, Inc., 1960.

Peak, H. Negative practice and theories of learning. Psychol. Rev., 1941, 48, 316-336.

Peak, H., Brooks, J., and Hobson, B. Positive and negative practice in the correction of spelling errors. J. of Psychol., 1941, 11, 103-114.

Peterson, J. Learning when frequency and recency factors are negative. J. exp. Psychol., 1922, 5, 270-300.

Postman, L. The history and present status of the law of effect. Psychol. Bull., 1947, 44, 489-563.

Skinner, B. F. Teaching machines. In A. A. Lumsdaine and R. Glaser (Eds.) Teaching machines and programmed learning: A source book. Washington, D. C.: National Education Association, 1960, pp. 137-159.

Smith, W. I. and Moore, J. W. Programmed learning: theory and research. Princeton: D. Van Nostrand Company, Inc., 1962, pp. 1-163.

Spence, K. W. The nature of discrimination learning in animals. Psychol. Rev., 1936, 43, 427-449.

Stolurow, L. M. Teaching by machine. Washington, D.C.: United States Printing Office, 1962.

Stone, G. R. The effect of negative incentives in serial learning. II Incentive intensity and response variability. J. gen. Psychol., 1950, 42, 179-224.

Wakeman, G. A. "A quantitative experiment on Dr. Dunlap's 'revision of the fundamental law of habit formation'", J. comp. Psychol., 1930, pp. 235-236.

Appendix A.

Words Used in Program in Order of Presentation

1. scenery
2. stubborn
3. foreign
4. accompanied
5. appearance
6. necessary
7. excellent
8. absence
9. traitor
10. accept
11. debt
12. architect
13. jealousy
14. recognize
15. ambitious
16. appreciate
17. community
18. boundary
19. cathedrals
20. brilliant
21. accumulate
22. lieutenant
23. knowledge
24. accidentally
25. collections
26. government
27. occasionally
28. geniuses
29. accident
30. ridiculous
31. exhibits
32. received
33. conceit
34. reign
35. handkerchief (omitted)
36. alien
37. deceive
38. perceive
39. commenced
40. literature (omitted)

APPENDIX B

SAMPLE

POSITIVE-PRACTICE

PROGRAM

UNDERLINE THE WORD THAT MEANS "WHAT SOMEONE KNOWS" OR "ALL THAT IS KNOWN OR CAN BE LEARNED."

KNOWLEDGE ABSENCE COMMUNITY DECEIVE

KNOWLEDGE

DIVIDE THE WORD KNOWLEDGE INTO SYLABLES (2). PUT A SLASH BETWEEN THE SYLLABLES.

KNOW/LEDGE

WRITE THE MISSING LETTERS. IT IS SAID THAT LINCOLN HAD MUCH K_ _WLEDGE.

KNOWLEDGE

HIS KNOWLE_ _E OF LAW WAS WELL KNOWN.

KNOWLEDGE

YOU MUST HAVE _ _ _ _LEDGE OF SEWING TO MAKE A DRESS.

KNOWLEDGE

THE INDIANS HAD MUCH _NO_LE_ _E ABOUT WILD ANIMALS.

KNOWLEDGE

DO YOU THINK THAT HE HAS ENOUGH KNOW_ _ _ _ _ TO DO THE JOB WELL?

KNOWLEDGE

K_ _ _ _ _ _ _ _ WILL HELP YOU SEE THINGS AS THEY REALLY ARE.

KNOWLEDGE

HE WISHED HE HAD MORE _____ OF ARITHMETIC.

KNOWLEDGE

UNDERLINE THE WORD WHICH MEANS "IN THE ARMY, AN OFFICER NEXT BELOW A CAPTAIN."

PERCEIVE LIEUTENANT DEBT ENCOURAGE

LIEUTENANT

DIVIDE THE WORD LIEUTENANT INTO SYLLABLES (3). PLACE A SLASH BETWEEN EACH SYLLABLE.

LIEU/TEN/ANT

WRITE THE MISSING LETTERS. HIS RANK WAS L_ _ _TENANT IN THE UNITED STATES ARMY.

LIEUTENANT

THERE ARE SEVERAL DIFFERENT RANKS IN THE OFFICE OF A LIEU_ _ _ANT.

LIEUTENANT

A _ _ _ _TENANT MUST STILL OBEY HIS SUPERIOR OFFICERS.

LIEUTENANT

THE SOLDIER GAVE THE LIEUTEN_ _ _ A SALUTE AS HE WALKED BY.

LIEUTENANT

THE L_ _ _ _ _ _ANT WAS PROMOTED AND BECAME A CAPTAIN.

LIEUTENANT

ALL THE MEN WHO KNEW HIM LIKED HIM AND AGREED THAT HE WAS A GOOD L_ _ _ _ _ _ _ _ _.

LIEUTENANT

IN THE WOMAN'S ARMY THERE IS AN OFFICER CALLED A _____, ALSO.

LIEUTENANT

UNDERLINE THE WORD WHICH MEANS "A GROUP OF PEOPLE LIVING IN THE SAME PLACE".

COMMUNITY HANDKERCHIEF DEBT DECEIVE

COMMUNITY

DIVIDE THE WORD COMMUNITY INTO SYLLABLES.(4) PUT A SLASH BETWEEN EACH SYLLABLE.

COM/MU/NI/TY

WRITE THE MISSING LETTERS. THEY ARE THE SAME.
THE CO_ _UNITY HAD A BAND CONCERT WHICH MANY PEOPLE ATTENDED.

COMMUNITY

WRITE THE MISSING LETTERS.
THE COMMUNI_ _ RAISED FUNDS TO BUILD A NEW SWIMMING POOL.

COMMUNITY

OUR COM_ _ _ _TY HAS A BUILDING FOR OUR YOUNG PEOPLE TO MEET.

COMMUNITY

THERE ARE SEVEN CHURCHES IN OUR _ _ _MUNITY.

COMMUNITY

A LARGE C_ _ _ _ _ _TY IS CALLED A CITY.

COMMUNITY

A SMALL C_ _ _ _ _ _ _ _ IS CALLED A TOWN.

COMMUNITY

THE PEOPLE WOULD NOT ALLOW SALESMEN IN THEIR _____.

COMMUNITY

UNDERLINE THE WORD WHICH MEANS "SPARKLING" OR "VERY BRIGHT".
BRILLIANT TRAITOR NECESSARY RECEIVE

BRILLIANT

DIVIDE THE WORD BRILLIANT INTO SYLLABLES. (2)
PUT A SLASH BETWEEN THE SYLLABLES.

BRIL/LIANT

WRITE THE MISSING LETTERS. THEY ARE THE SAME.
THE DIAMOND WAS VERY BRI__IANT.

BRILLIANT

WRITE THE MISSING LETTERS.
THE MAN POLISHED HIS CAR SO THAT IT WAS _ _ILLIANT.

BRILLIANT

IN A JEWELRY STORE THERE ARE MANY BRILL_ _NT STONES.

BRILLIANT

THE SUN GAVE A BRIL_ _ _ _ _ LIGHT.

BRIL**LIANT**

ONE SHOULD NOT LOOK AT THE BR_ _ _ _ _NT SUN WITHOUT DARK GLASSES.

BRILLIANT

THE SINGER STOOD IN THE B_ _ _ _ _ _ _ _ LIGHT.

BRILLIANT

AFTER ONE CLEANS A RING, IT IS _____.

BRILLIANT

WHICH WORD MEANS "ALIEN IN CHARACTER" OR "SITUATED OUTSIDE ONE'S OWN COUNTRY"? UNDERLINE THE WORD.
FOREIGN BOUNDARY SCENERY RECOGNIZE

FOREIGN

DIVIDE THE WORD FOREIGN INTO SYLLABLES. (2) PLACE A SLASH BETWEEN THE SYLLABLES.

FOR/EIGN

WRITE THE MISSING LETTERS.
THE SPANISH GIRL'S WAY OF LIFE WAS ENTIRELY _ _ _EIGN TO HER AMERICAN FRIEND.

FOREIGN

IF YOU ARE AN AMERICAN, SPAIN IS A FOR_ _GN COUNTRY TO YOU.

FOREIGN

ALL COUNTRIES OTHER THAN THE ONE IN WHICH WE LIVE ARE CALLED FOREI_ _ COUNTRIES.

FOREIGN

VISITING FOR_ _ _N LANDS TEACHES US MUCH ABOUT UNDERSTANDING OTHER PEOPLE.

FOREIGN

A F_ _ _ _ _ _ IDEA DOES NOT ALWAYS SEEM WORTHWHILE AT FIRST.

FOREIGN

SNOW IS _____TO MANY AREAS OF THE UNITED STATES.

FOREIGN

SAMPLE

NEGATIVE-PRACTICE

PROGRAM

Note: Each word was programmed to fit the spelling error committed by the student. (See text for explanation)

UNDERLINE THE WORD THAT MEANS "WHAT SOMEONE KNOWS" OR "ALL THAT IS KNOWN OR CAN BE LEARNED."

KNOWLEDGE ABSENCE COMMUNITY DECEIVE

KNOWLEDGE

DIVIDE THE WORD KNOWLEDGE INTO SYLLABLES. (2) PUT A SLASH BETWEEN THE SYLLABLES.

KNOW/LEDGE

YOU MISSPELLED THE WORD KNOWLEDGE. YOU SPELLED IT _____. IN THE FOLLOWING FRAMES YOU ARE TO WRITE THE WORD IN THE SAME WAY AS YOU DID WHEN YOU MIS-SPELLED IT ON THE TEST.

IT IS SAID THAT LINCOLN HAD MUCH _____ (KNOWLEDGE).

KNOWLEDGE

HIS _____ (KNOWLEDGE) OF LAW WAS WELL KNOWN.

KNOWLEDGE

YOU MUST HAVE _____ (KNOWLEDGE) OF SEWING TO MAKE A DRESS.

KNOWLEDGE

THE INDIANS HAD MUCH _____(KNOWLEDGE) ABOUT WILD ANIMALS.

KNOWLEDGE

DO YOU THINK THAT HE HAS ENOUGH _____ (KNOWLEDGE) TO DO THE JOB WELL?

KNOWLEDGE

_____(KNOWLEDGE) WILL HELP YOU SEE THINGS AS THEY REALLY ARE.

KNOWLEDGE

HE WISHED HE HAD MORE _____(KNOWLEDGE) OF ARITHMETIC.

KNOWLEDGE

UNDERLINE THE WORD WHICH MEANS "IN THE ARMY, AN OFFICER NEXT BELOW A CAPTAIN".

PERCEIVE LIEUTENANT DEBT ENCOURAGE

LIEUTENANT

DIVIDE THE WORD LIEUTENANT INTO SYLLABLES. (3) PLACE A SLASH BETWEEN EACH SYLLABLE.

LIEU/TEN/ANT

YOU MISSPELLED THE WORD LIEUTENANT. YOU SPELLED IT _____. IN THE FOLLOWING FRAMES YOU ARE TO WRITE THE WORD IN THE SAME WAY AS YOU DID WHEN YOU MISSPELLED IT ON THE TEST.

HIS RANK WAS _____(LIEUTENANT) IN THE UNITED STATES ARMY.

LIEUTENANT

THERE ARE SEVERAL DIFFERENT RANKS IN THE OFFICE OF A _____(LIEUTENANT).

LIEUTENANT

A _____(LIEUTENANT) MUST STILL OBEY HIS SUPERIOR OFFICERS.

LIEUTENANT

THE SOLDIER GAVE THE _____(LIEUTENANT) A SALUTE AS HE WALKED BY.

LIEUTENANT

THE _____(LIEUTENANT) WAS PROMOTED AND BECAME A CAPTAIN.

LIEUTENANT

ALL THE MEN WHO KNEW HIM LIKED HIM AND AGREED THAT HE WAS A GOOD _____(LIEUTENANT).

LIEUTENANT

IN THE WOMAN'S ARMY THERE IS AN OFFICER CALLED A _____(LIEUTENANT), ALSO.

LIEUTENANT

UNDERLINE THE WORD WHICH MEANS "A GROUP OF PEOPLE LIVING IN THE SAME PLACE".

COMMUNITY HANDKERCHIEF DEBT DECEIVE

COMMUNITY

DIVIDE THE WORD COMMUNITY INTO SYLLABLES. (4) PUT A SLASH BETWEEN EACH SYLLABLE.

COM/MU/NI/TY

YOU MISSPELLED THE WORD COMMUNITY. YOU SPELLED IT _____. IN THE FOLLOWING FRAMES YOU ARE TO WRITE THE WORD IN THE SAME WAY AS YOU DID WHEN YOU MISSPELLED IT ON THE TEST.

THE _____(COMMUNITY) HAD A BAND CONCERT WHICH MANY PEOPLE ATTENDED.

COMMUNITY

THE _____(COMMUNITY) RAISED FUNDS TO BUILD A NEW SWIMMING POOL.

COMMUNITY

OUR _____(COMMUNITY) HAS A BUILDING FOR OUR YOUNG PEOPLE TO MEET.

COMMUNITY

THERE ARE SEVEN CHURCHES IN OUR _____ (COMMUNITY).

COMMUNITY

COMMUNITY

A LARGE _____(COMMUNITY) IS CALLED A CITY.

COMMUNITY

COMMUNITY

A SMALL _____(COMMUNITY) IS CALLED A TOWN.

COMMUNITY

COMMUNITY

THE PEOPLE WOULD NOT ALLOW SALESMEN IN THEIR _____(COMMUNITY).

COMMUNITY

UNDERLINE THE WORD WHICH MEANS "SPARKLING" OR "VERY BRIGHT".
BRILLIANT TRAITOR NECESSARY RECEIVE

BRILLIANT

DIVIDE THE WORD BRILLIANT INTO SYLLABLES. (2) PUT A SLASH BETWEEN THE SYLLABLES.

BRIL/LIANT

YOU MISSPELLED THE WORD BRILLIANT. YOU SPELLED IT _____.
IN THE FOLLOWING FRAMES YOU ARE TO WRITE THE WORD IN THE SAME WAY AS YOU DID WHEN YOU MISSPELLED IT ON THE TEST.

THE DIAMOND WAS VERY _____(BRILLIANT).

BRILLIANT

THE MAN POLISHED HIS CAR SO THAT IT WAS _____
(BRILLIANT).

BRILLIANT

IN A JEWELRY STORE THERE ARE MANY _____
(BRILLIANT) STONES.

BRILLIANT

THE SUN GIVES A _____(BRILLIANT) LIGHT.

BRILLIANT

ONE SHOULD NOT LOOK AT THE _____(BRILLIANT) SUN WITHOUT DARK GLASSES.

BRILLIANT

THE SINGER STOOD IN THE _____(BRILLIANT) LIGHT.

BRILLIANT

AFTER ONE CLEANS A RING IT IS _____ (BRILLIANT).

BRILLIANT

WHICH WORD MEANS "ALIEN IN CHARACTER" OR "SITUATED OUTSIDE ONE'S OWN COUNTRY"? UNDERLINE THE WORD.
FOREIGN BOUNDARY SCENERY RECOGNIZE

FOREIGN

DIVIDE THE WORD FOREIGN INTO SYLLABLES. (2) PLACE A SLASH BETWEEN THE SYLLABLES.

FOR/EIGN

YOU MISSPELLED THE WORD FOREIGN. YOU SPELLED IT _____. IN THE FOLLOWING FRAMES YOU ARE TO WRITE THE WORD IN THE SAME WAY AS YOU DID WHEN YOU MISSPELLED IT ON THE TEST.

THE SPANISH GIRL'S WAY OF LIFE WAS ENTIRELY _____ (FOREIGN) TO HER AMERICAN FRIEND.

FOREIGN

IF YOU ARE AN AMERICAN, SPAIN IS A _____ (FOREIGN) COUNTRY TO YOU.

FOREIGN

ALL COUNTRIES OTHER THAN THE ONE IN WHICH WE LIVE ARE CALLED _____(FOREIGN) COUNTRIES.

FOREIGN

VISITING _____(FOREIGN) LANDS TEACHES US MUCH ABOUT UNDERSTANDING OTHER PEOPLE.

FOREIGN

A _____(FOREIGN) IDEA DOES NOT ALWAYS SEEM WORTHWHILE AT FIRST.

FOREIGN

SNOW IS _____(FOREIGN) TO MANY AREAS OF THE UNITED STATES.

FOREIGN

SAMPLE

REPETITION OF RESPONSE

POSITIVE PRACTICE

ACCIDENTALLY MEANS "IN AN ACCIDENTAL MANNER" OR "NOT ON PURPOSE".
ON THE TEST GIVEN EARLIER YOU DID NOT SPELL THIS WORD CORRECTLY.
FILL THE BLANKS BELOW WITH THE CORRECT SPELLING OF THIS WORD.

_____(ACCIDENTALLY) _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

RIDICULOUS MEANS "THE QUALITY OF BEING SILLY" OR "LAUGHABLE".
ON THE TEST GIVEN EARLIER YOU DID NOT SPELL THIS WORD CORRECTLY.
FILL THE BLANKS BELOW WITH THE CORRECT SPELLING OF THIS WORD.

_____(RIDICULOUS) _____

_____ _____ _____

_____ _____

_____ _____

_____ _____ _____

_____ _____

_____ _____

_____

ALIEN MEANS "STRANGE, FOREIGN" OR "BELONGING TO ANOTHER COUNTRY."
ON THE TEST GIVEN EARLIER YOU DID NOT SPELL THIS WORD CORRECTLY.
FILL THE BLANKS BELOW WITH THE CORRECT SPELLING OF THIS WORD.

_____(ALIEN) _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____

AMBITIOUS MEANS TO WORK VERY HARD.
ON THE TEST GIVEN EARLIER YOU DID NOT SPELL THIS WORD CORRECTLY.
FILL THE BLANKS BELOW WITH THE CORRECT SPELLING OF THIS WORD.

_____(AMBITIOUS) _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____

AN ARCHITECT IS A PERSON WHO DRAWS PLANS FOR BUILDINGS.
ON THE TEST GIVEN EARLIER YOU DID NOT SPELL THIS WORD
CORRECTLY. FILL THE BLANKS BELOW WITH THE CORRECT SPELLING
OF THIS WORD.

_____(ARCHITECT) _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

SAMPLE

REPETITION OF RESPONSE

NEGATIVE PRACTICE

ACCIDENTALLY MEANS "IN AN ACCIDENTAL MANNER" OR "NOT ON PURPOSE".
ON THE TEST GIVEN EARLIER YOU SPELLED ACCIDENTALLY AS _____.
FILL THE BLANKS BELOW WITH <u>YOUR</u> <u>MISSPELLING</u> OF THE WORD, BUT
REMEMBER THE CORRECT SPELLING.

_____(ACCIDENTALLY)_____(ACCIDENTALLY)

_____(ACCIDENTALLY)_____(ACCIDENTALLY)

_____(ACCIDENTALLY)_____(ACCIDENTALLY)

_____(ACCIDENTALLY)_____(ACCIDENTALLY)

_____(ACCIDENTALLY)_____(ACCIDENTALLY)

_____(ACCIDENTALLY)_____(ACCIDENTALLY)

_____(ACCIDENTALLY)_____(ACCIDENTALLY)

_____(ACCIDENTALLY)

RIDICULOUS MEANS "THE QUALITY OF BEING SILLY" OR "LAUGHABLE".
ON THE TEST GIVEN EARLIER YOU SPELLED RIDICULOUS _____.
FILL THE BLANKS BELOW WITH <u>YOUR</u> <u>MISSPELLING</u> OF THE WORD, BUT
REMEMBER THE CORRECT SPELLING.

_____(RIDICULOUS) _____(RIDICULOUS)

_____(RIDICULOUS) _____(RIDICULOUS)

_____(RIDICULOUS) _____(RIDICULOUS)

_____(RIDICULOUS) _____(RIDICULOUS)

_____(RIDICULOUS) _____(RIDICULOUS)

_____(RIDICULOUS) _____(RIDICULOUS)

_____(RIDICULOUS) _____(RIDICULOUS)

_____(RIDICULOUS)

ALIEN MEANS "STRANGE, FOREIGN" OR "BELONGING TO ANOTHER COUNTRY." ON THE TEST GIVEN EARLIER YOU SPELLED ALIEN AS _____. FILL THE BLANKS BELOW WITH <u>YOUR</u> <u>MISSPELLING</u> OF THE WORD, BUT REMEMBER THE CORRECT SPELLING.

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

_____(ALIEN)

AMBITIOUS MEANS TO WORK VERY HARD.
ON THE TEST GIVEN EARLIER YOU SPELLED AMBITIOUS AS _____.
FILL THE BLANKS BELOW WITH <u>YOUR</u> <u>MISSPELLING</u> OF THE WORD, BUT REMEMBER THE CORRECT SPELLING.

_____(AMBITIOUS) _____(AMBITIOUS)

_____(AMBITIOUS) _____(AMBITIOUS)

_____(AMBITIOUS) _____(AMBITIOUS)

_____(AMBITIOUS) _____(AMBITIOUS)

_____(AMBITIOUS) _____(AMBITIOUS)

_____(AMBITIOUS) _____(AMBITIOUS)

_____(AMBITIOUS) _____(AMBITIOUS)

_____(AMBITIOUS)

AN ARCHITECT IS A PERSON WHO DRAWS PLANS FOR BUILDINGS.
ON THE TEST GIVEN EARLIER YOU SPELLED ARCHITECT AS _____
FILL THE BLANKS BELOW WITH <u>YOUR</u> <u>MISSPELLING</u> OF THE WORD, BUT
REMEMBER THE CORRECT SPELLING.

_____(ARCHITECT) _____(ARCHITECT)

_____(ARCHITECT) _____(ARCHITECT)

_____(ARCHITECT) _____(ARCHITECT)

_____(ARCHITECT) _____(ARCHITECT)

_____(ARCHITECT) _____(ARCHITECT)

_____(ARCHITECT) _____(ARCHITECT)

_____(ARCHITECT) _____(ARCHITECT)